

Sub A2

ABSTRACT

1 A process for producing alkyl esters useful in biofuels and lubricants by
2 transesterifying glyceride- or esterifying free fatty acid- containing substances in a single
3 critical phase medium is disclosed. The critical phase medium provide increased reaction
4 rates, decreases the loss of catalyst or catalyst activity and improves the overall yield of
5 desired product. The process involves the steps of dissolving an input glyceride- or free
6 fatty acid- containing substance with an alcohol or water into a critical fluid medium;
7 reacting the glyceride- or free fatty acid- containing substance with the alcohol or water
8 input over either a solid or liquid acidic or basic catalyst and sequentially separating the
9 products from each other and from the critical fluid medium, which critical fluid medium
10 can then be recycled back in the process. The process significantly reduces the cost of
11 producing additives or alternatives to automotive fuels and lubricants utilizing
12 inexpensive glyceride- or free fatty acid- containing substances, such as animal fats,
13 vegetable oils, rendered fats, and restaurant grease.